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Remarks

Thorough examination by the Examiner is noted and appreciated.

The Specification has been amended to clarify Applicants invention.

Support for the amendments are found in the Specification, the original claims and the Figures. No new matter has been added.

For example support in the Specification is found at paragraph 0044:

"After the chip 76 with the anchor structure 89 and the bonding pad 80 is fabricated in the manner heretofore described, the **bonding wire 100 is attached to the upper surface of the bonding pad 80 typically using a thermosonic bond 102** for example, as shown, or **any suitable alternative wirebonding technique**. The chip 76 may then be **subjected to physical tests** to determine the structural and functional integrity of the chip 76. Accordingly, much of the shear and other stress applied to the bonding pad 80 is distributed to the anchor structure 89,

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such that the bonding pad bridges 90 and the bonding pad anchor pad 92, the conductive layer anchor pads 94 and the anchor vias 96 of the continuous anchor ring 91 absorb much of the stress and thus prevent excessive stress from being exerted on the **relatively fragile top dielectric layer 82**. Furthermore, the anchor structure 89 reduces the tendency of the bonding pad 80 to peel or become dislodged from the top dielectric layer 82. Consequently, the chip 76 is characterized by enhanced functional and structural integrity and the **top dielectric layer 82** is unlikely to be cracked or otherwise damaged during testing or during normal use of the electronic apparatus of which the chip 76 is a part."

Support for new claims 21 through 23 is found in the Figures 6, 8 and 10.

Support for new claims 24-29 is found in the Specification at paragraphs 0035 and 0046:

"As shown in FIG. 5, in a preferred embodiment the bonding pad 50 has a generally octagon-shaped configuration, with **truncated corners 50a** and flat edges 50b. However, it is understood that the bonding pad 50 may have alternative shapes.

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The truncated corners 50a eliminate sharp corners from the bonding pad 50 which would otherwise present excessive shear stress against the top dielectric layer 52 during physical testing of the chip 46, thus imparting additional structural and functional integrity to the chip 46."

"Referring next to FIG. 9, in another embodiment of the chip 1 of the present invention, the bonding pad 2 has **rounded corners** 2a and flat edges 2b. One or more anchor structures 59 is provided in contact with the bonding pad 2 through a corresponding bonding pad bridge 60, as heretofore described with respect to the wirebonded chip 46 of FIGS. 5 and 6. The rounded corners 2a eliminate sharp corners from the bonding pad 2 which would otherwise present excessive shear stress against the top dielectric layer 52 during physical testing of the chip 1, thus imparting additional structural and functional integrity to the chip 1."

Claim Rejections under 35 USC 102

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1. Claims 1-4 stand rejected under 35 USC 102(b) as being anticipated by Alswede et al. (US 5,917,197).

Alswede et al. disclose a multi-layer test pad where an underlying matrix of interconnected test pads has an oxide between rows and columns and where an overlying matrix of test pads is disposed over the oxide layer and has a larger surface area and overlaps one or more of the underlying test pads (see Abstract; col 3, lines 26-43; lines 44-59; lines 60 to col 4 line 5). In a preferred embodiment shown in Figure 4, a top pad is removed in a top view of the multi-layer test pad structure to show the underlying 3x3 test pad matrix portion (e.g., items 406, 406a, 402b) that are overlapped by a larger overlying test pad (e.g., item 402a-402d); see col 5, lines 37-50).

The multi-layer test pad structure of Alswede et al., is designed to overcome the problems of reducing the amount of metal that must be cut in a dicing operation (i.e., multi-layer test pad is located in a kerf region (die cutting region) (see col 1, lines 52-67; col 2, lines 42-47; col 4, lines 48-52) and to overcome the problem of etching of underlying test pads during a wet etch process (crack stop etch) following a dry etch process (TV etch) to etch an oxide layer underlying and between the upper

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test pads (col 2, lines 57-col 3, line 18; col 4, lines 45-49; col 5, lines 8-15; col 6, line 64= col 7, line 3). The upper test pads are connected to the lower test pads by vias (col 3, lines 40-43; col 5, lines 45-50).

Thus Alswede et al. does not disclose several aspects of Applicants disclosed and claimed invention.

Alswede et al. does not disclose:

"A structure for reinforcing a bonding pad following a bonding operation, said bonding pad connected to at least one underlying conductive layer on a substrate a bonding pad."

Alswede et al. also does not disclose:

"at least one anchor structure disposed horizontally adjacent to said bonding pad and at least one conductive layer underlying said bonding pad, said at least one anchor structure interconnected to the bonding pad and to the at least one underlying conductive layer;

wherein said bonding pad and said anchor structure are

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horizontally adjacently surrounded by a dielectric layer."

Thus, Alswede et al. is clearly insufficient to anticipate Applicants disclosed and claimed invention.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

2. Claims 13-15 stand rejected under 35 USC 102(b) as being anticipated by Alswede et al., above.

Applicants reiterate to comment made with respect to Alswede et al., above.

Alswede do not disclose several elements of Applicants disclosed and claimed invention including:

"A structure for reinforcing a bonding pad following a bonding operation, said bonding pad connected to a plurality of

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underlying conductive layer levels through a plurality of insulative layers disposed on a substrate, comprising:

at least one multi-level anchor structure disposed horizontally adjacent and interconnected to the bonding pad and to the conductive layers, said anchor structure and conductive layers interconnected by a conductor layer bridge extending between the anchor structure and a respective conductor layer at a respective level;

wherein the anchor structure at the uppermost level of said at least one multi-level anchor structure comprises a bonding pad anchor pad, said bonding pad anchor pad connected to said bonding pad by a bonding pad bridge extending between said bonding pad anchor pad and said bonding pad; and,

wherein said bonding pad, said bonding pad anchor pad, and said bonding pad bridge are horizontally adjacently surrounded by an uppermost insulative layer."

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Alswede et al. is clearly insufficient to anticipate Applicants disclosed and claimed invention.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

3. Claims 18-19 stand rejected under 35 USC 102(b) as being anticipated by Alswede et al., above.

Applicants reiterate to comment made with respect to Alswede et al., above.

Alswede does not disclose several elements of Applicants disclosed and claimed invention including:

"A method of reinforcing a bonding pad following a bonding operation, said bonding pad connected through conductive vias to a plurality of underlying conductive layers deposited on a substrate, comprising the step of:

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forming at least one anchor structure disposed horizontally adjacent to said bonding pad and at least one conductive layer underlying said bonding pad, said at least one anchor structure formed interconnected to the bonding pad and to the at least one underlying conductive layer;

wherein said at least one anchor structure is formed horizontally interconnected by a respective conductor bridge extending between said anchor structure and said bonding pad and between said anchor structure said at least one conductor layer; and,

wherein said anchor structure and said respective conductor bridges are horizontally adjacently surrounded by a dielectric layer including at an uppermost level."

Alswede et al. is clearly insufficient to anticipate Applicants disclosed and claimed invention.

"A claim is anticipated only if each and every element as

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set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Claim Rejections under 35 USC 103

1. Claims 9-11 stand rejected under 35 USC 102(b) as being unpatentable over Alswede et al., above.

Applicants reiterate to comment made with respect to Alswede et al., above.

Moreover, Applicants note that the purpose and operation of the structure of Alswede et al. works by a different principle of operation, i.e., to minimize the amount of metal cut in a dicing operation (where the probe contacting testing structures are located) and to minimize wet etching of underlying test pad structures following dry and wet etching of an underlying oxide layer.

Thus, the test pad structure of Alswede et al. could not be

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used as a bonding pad structure, nor is there any suggestion by Alswede et al. that it could be, and any modification of Alswede et al. to achieve Applicants disclosed and claimed invention would render the structure of Alswede et al. unsuitable for its intended operation and unsuitable as use as a bonding pad.

Nevertheless, even assuming *arguendo* a proper motivation for modifying Alswede et al. as Examiner suggests, such modification does not produce Applicants disclosed and claimed invention.

For example, Alswede et al. specifically teach away from a structure such as Applicants: "wherein said bonding pad and said anchor structure are horizontally adjacently surrounded by a dielectric layer" (Alswede et al. **teach partially etching away an underlying oxide layer**) and nowhere recognize or provide a solution to the problem. Applicants have recognized and overcome by their disclosed and claimed invention:

"A structure for reinforcing a bonding pad following a bonding operation, said bonding pad connected to at least one underlying conductive layer on a substrate."

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"Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vacck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

"If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

2. Claims 17-19 stand rejected under 35 USC 102(b) as being unpatentable over Alswede et al., above.

Applicants reiterate to comment made with respect to Alswede et al., above.

Further, since Alswede et al. do not disclose "wherein said anchor structure and said respective conductor bridges are horizontally adjacently surrounded by a dielectric layer

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including at an uppermost level", neither is Applicants crack zone disclosed.

"Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Based on the foregoing, Applicants respectfully submit that the Claims are now in condition for allowance. Such favorable action by the Examiner at an early date is respectfully solicited."

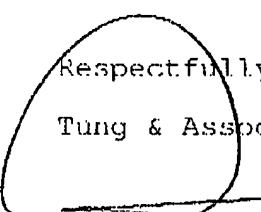
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In the event that the present invention as claimed is not in condition for allowance for any reason, the Examiner is respectfully invited to call the Applicants' representative at his Bloomfield Hills, Michigan office at (248) 540-4040 such that necessary action may be taken to place the application in a condition for allowance.

Respectfully submitted,

Tung & Associates


Randy W. Tung

Reg. No. 31,311

Telephone: (248) 540-4040